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ABSTRACT

This report, which considers the role of networking activities associated with the technical telecommunication links that bind libraries, services, and patrons together, begins with a historical review of libraries and automation-based systems over the last 19 years. The importance of the development and implementation of standards in interactive library activities for librarians using state or regional telecommunications networks is then discussed, including such factors as the need for increased functionality, performance reliability, consistent user assistance, access, and participation in governance. Also discussed are the activities of the various regional networks involved in the Linked Systems Project (LSP), including the development of standards for information transfer between systems via the telecommunications standard known as the Open Systems Interconnection (OSI). The development of the Office of Library Program's leadership role in interlibrary cooperation, especially in the application of federal funding to inter- and intra-state cooperative programs for resource sharing, is also described. A concluding statement briefly discusses a number of issues currently involved in networking, and 10 recommendations are offered for the guidance of the Office of Library Programs in working toward the development of an underlying information infrastructure parallel with the telecommunications infrastructure being created by the National Science Foundation (NSF) and other federal agencies. (5 references) (CGD)

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LIBRARY NETWORKING: The Interface of Ideas and Actions

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INTRODUCTION

A major and long-standing source of strength for library services is found in the variety of activities that fall under the rubric of "interlibrary cooperation." Patrons benefit from programs with names that mean little to them: cooperative acquisitions, shared cataloging, interlibrary lending, reference referral, and the like. Frequently such activities are covered by the umbrella term "networking." The object of this report is to examine such activities as they are supported, or might be supported, by networking of another kind - the technical telecommunication links that bind libraries, services, and patrons together, often across traditional boundaries.

There is constant confusion in the library and information community regarding the dual nature of networking, particularly as two meanings or functions intertwine so strongly in today's libraries. Most of the references to networking in library literature refer to the resource-sharing aspect of the term, despite the fact that the enabling mechanism for such sharing is telecommunications. Most have assumed that someone else is worrying about the wires. Such a dichotomy is common in our technical civilization--very few of us know anything about the automobiles we drive, yet we depend on them daily. Libraries would be better off, and in a stronger position politically, if there were more individual awareness of telecommunications technology and if there were less distance between technological development and its use. I do not believe librarians are adequately served when systems, both hardware and software, are developed FOR us without our involvement. Rather, we should be participating in their design, thus increasing the likelihood that the results will match the needs of our clientele, while strengthening the perception of libraries as integral components of the information system.

Librarianship is, pronouncedly, a technology-based discipline. Virtually every aspect of the profession is supported by some information technology, be it computers, compact discs, video discs, laser printers, line drivers, or optical scanners. Today's librarians face a variety of options in their use of technology, including the technology that links them all together--telecommunications. Choosing telecommunications services presents the newest, and perhaps most challenging, set of options librarians face. However, telecommunications, when used to reach beyond the immediate environment, carries implications of standardized interactions between systems. Decisions that librarians are making daily in choosing systems and purchasing equipment and software, implicate and constrain the future of resource sharing.

Through its Library Services and Construction Act (LSCA) Title I, II, and III programs, the Federal government provides approximately $118 million of support for the development of public library resources and services. While that may represent only 4 to 5 percent of public library expenditures (State and local monies are estimated at $3 billion), Federal dollars provide a strong and important leverage

for change. Therefore, with the administration of LSCA programs comes responsibility as well as accountability. What role can or should the Office of Library Programs play in the area of networking, both resource sharing and telecommunications, that is different from that which it currently plays? This report:

- examines where networking is today, in both its technical and non-technical sense,
- describes a leadership role for the Office of Library Programs, and
- recommends action to be taken on the part of the Office of Library Programs.

THE ISSUES AND THE PLAYERS

Libraries have participated in automation-based systems since the early 1970's when activities at the National Library of Medicine (NLM) and the Ohio College Library Center (OCLC, now Online Computer Library Center) began to reach--more or less effectively--beyond the walls of a single institution. Libraries' initial use of telecommunications systems beyond telephone systems began with the availability of shared cataloging from OCLC in 1971. OCLC had created a central file of cataloging records to be accessed and shared by member libraries in Ohio, thereby avoiding duplication of effort as libraries cataloged the same title across the State. It is important to note that Federal monies were used to encourage the development of OCLC. In 1970, seed money totaling nearly a quarter million dollars was granted under the Higher Education Act (HEA) Title II-B. HEA funding plays a role for academic libraries similar to that of LSCA for public libraries. A second use of the shared cataloging data file was as a resource for interlibrary loan activities. When they used a catalog record, participating libraries recorded their ownership of the item for view by other libraries. This activity has produced a vast database of holdings information in both OCLC and RLG (Research Libraries Group) which, formally or informally, forms the basis of the nationwide practice of interlibrary loan.

Telecommunications services were from the start folded into the access and use agreements of OCLC and RLG. Libraries purchased such services with little knowledge or understanding of their capabilities or potential. OCLC and other bibliographic utilities, as they came to be called, worked hard to provide a seamless connection between a librarian's terminal and the utility's mainframes. They were able to adapt both telecommunications hardware and software to specialized library applications, resulting in early telecommunications networks that worked effectively and soon were taken for granted and relied upon daily.

Another major use of automation occurred with the advent of remote databases which stored indexing information to millions of journal citations. Accessed through commercial telecommunications links, such databases proved invaluable to scholars, the business community, and others faced with the growing task of culling relevant material from ever-increasing numbers of journals, technical reports, and other serials. NLM offered 24 medical libraries interactive searching of the Medline bibliographic database in 1971. Medline was accessed across the United States by means of the TWX network. Such efforts represented pioneering uses of the still-evolving computer technologies; uses which are almost universally ignored in the history of computing. Today librarians daily conduct more than 5,400 searches of NLM's databases and record more than 2.5 million transactions against OCLC's databases. In addition, hundreds of commercial bibliographic databases are available for searching as are the extensive files of organizations such as RLG's Research Libraries Information Network (RLIN) system and the Western Library Network (WLN, formerly the Washington Library Network) files. As users of telecommunications services, librarians rank near the top, along with the banking and airline industries.

Standards Developers

Adequate standards are essential for successful resource sharing. Without a common communications format, librarians would find it exceedingly difficult to: identify a needed item held by a library hundreds or thousands of miles away; catalog an item in hand from a record generated at the Library of Congress; and search multiple databases for a subject of interest and retrieve relevant citations. Yet these are representative activities occurring hundreds of thousands of times every hour. Such transactions are enhanced, and in some cases enabled, because in 1968 the library community, under the visionary leadership of Henriette Avram, now Associate Librarian for Processing Services at the Library of Congress, developed the MARC communications format--the common denominator between many disparate systems. Standards were already in place that governed how a book was to be bibliographically described, e.g., how to determine the author, title, pagination, and copyright and publication dates. The MARC format provided a uniform mechanism for recording such data in machine readable form. Currently, MARC formats exist for all forms of publication, from maps to computer files.

While additional standards for activities such as indexing and abstracting, record structuring for full-text retrieval, and subject access are urgently needed, standards development today rests on a different plane--system inter-operability. Because there is no connection between the various utilities, librarians frequently use three or four different systems, often accompanied by separate hardware, to accomplish the activities described above. Because the multiplicity of access mechanisms wastes both human and fiscal/equipment resources, the library community has been working to provide pass-through, computer-to-computer access among complex information systems.

In 1976, the Library of Congress created the Network Development Office. A year later, the Network Advisory Committee (NAC) began working with the Library of Congress to address the national need for a network capable of supporting library needs. Early in 1978, a task force was established by NAC and charged with designing an interconnect mechanism to be used by the Research Libraries Group (RLG) and other bibliographic utilities. The group, called the Network Technical Architecture Group, continued work done by the National Commission on Libraries and Information Science (NCLIS) with the National Bureau of Standards (NBS).

In 1980, librarians, administrators, and network specialists representing the Research Libraries Group (RLG), the Western Library Network (WLN), the Library of Congress (LC), and OCLC (first as an observer, then participant), took a bold step. They agreed, for the purpose of computer-to-computer communication, to adopt and work within a fledgling telecommunications standard--the Open Systems Interconnection (OSI) reference model. OSI, formalized as a conceptual model in 1982, offered a seven-layer model which addressed physical connection at the lowest layer and application support at the upper layer (Denenberg). OSI is written to support a wide range of applications, library application being only one.

The library community placed itself squarely in the forefront of standard-setting activity by adopting this model and working with vendors, carriers, the Federal government, and other interested parties to develop and implement the standard.

The library-based OSI work, known as the Linked Systems Project (LSP), addressed sharing standardized forms of authors' names (name authority data) between systems. In August 1985, RLG began receiving name authority data through the LSP link from the Library of Congress. As of June 1987, the main library at Yale, an RLG member, began to contribute name authority data through the RLIN system to LC. Three RLG libraries and one OCLC library are now contributors to LC through LSP/OSI links. The next steps will be the transfer of bibliographic records, and the capability to search among the three participant systems. The specifications for such applications were finalized at the end of 1987 but implementation will take at least 2 years. Joining LC, RLG, and OCLC in this endeavor are representatives of an academic library network, the Triangle Research Libraries Network (TRLN), and two commercial library system vendors, NOTIS and Geac. As with OCLC, HEA Title II-C monies provided participating libraries approximately $1.6 million of critical development support for TRLN.

In addition to the practical result of developing a working application, the LSP/OSI work has significantly raised the level of awareness among computer specialists of library networking needs and their ability to join with other networking specialists in addressing those needs.

Although the value of the OSI/LSP work should not be underestimated, it can only be seen as a first step. The work affords valuable experience to a limited group of developers but only begins to address the problems libraries face in the areas of online public access catalogs (OPACs), turnkey circulation systems, vendor-based acquisitions systems, and incompatible bibliographic database search services. Insofar as these thousands of systems are MARC-based, we are one step along the path to inter-operability. There are, however, many more steps to take, and very few people to lead the way. Without the wholesale adoption of OSI as the telecommunications protocol of choice for information transfer, customized linkages will need to be constructed to connect specific systems. Making such linkages is expensive, time consuming, and wasteful. However, they are likely to be the pattern for some time unless librarians muster the leadership capability and coalesce around the need to both develop and follow standards. There is little doubt in the minds of network administrators, such as Steven Wolff at the National Science Foundation (NSF), that OSI will eventually be adopted. It is in the best interest of libraries that it happen sooner rather than later. We may be spared years of working ineffectively and at cross purposes, not to mention the expense involved, if we can "get our act together." This report recommends a leadership role for the Office of Library Programs in that task.

Standards Implementers

Computing activities, basic and critical as they are to the work of society, have been carried out in relatively confining environments. Colleges, universities, State and local governments, industries, and businesses historically made choices. They were "IBM shops," "DEC shops," or "Wang shops." The capability to share data was addressed, though hardly solved, at the hardware level--"if you want to interact with me you have to use my brand of equipment." Early networks were proprietary and hardware dependent. The early versions of DECnet, Wangnet, and others are examples of this monolithic approach to linking systems.

Organizations such as the Department of Defense (DOD) began moving toward software solutions, or protocols, in the 1970's. Protocols such as TCP/IP allowed for an exchange of data between different brands of hardware but not necessarily for easy user access or use. However, protocols such as TCP/IP fall under no official standards-setting organization. The result is that many versions exist and a high degree of sophistication is needed to make an informed choice. A true case of caveat emptor. Even the ISO protocols set by the International Standards Organization leave numerous options within the standard. Profiles for individual communities, such as LSP has done for libraries, must be developed for other user groups. In addition, testing for compatibility will be required. This topic is addressed below.

Vendors of telecommunications software and hardware play a major role in the implementation of networking standards. Until such time as OSI-based products are available "off the shelf," adoption will be both slow and erratic. This situation has elements of a "Catch-22," however. If librarians are truly concerned with information sharing, they must include clear statements requiring OSI functionality in requests for proposals and purchase agreements.

Such specifications are critical to encouraging the development of OSI products. My first recommendation, therefore, is that the Office of Library Programs work with States to assure that LSCA funding is used to support only automated systems that have OSI capability. This recommendation is expanded upon in the last section of this report.

The National Science Foundation (NSF), along with the Department of Defense (DOD), is the major developer of telecommunications networks in this country. Both organizations have sought to maximize the use of the expensive, specialized supercomputers located in a dozen or more places across the country. To accomplish this, and to facilitate communication between researchers, they have provided a vast system of telecommunications networks, all of which run the protocol system called TCP/IP.

Network administrators for systems such as the NSF backbone NSFNET, regional networks such as SURANE in the mid-Atlantic area and MIDNET in the mid-West, and State networks such as New York's NYSERNET, recognize the limits of TCP/IP protocols. Furthermore, they are anxious to see increased use of their networks, particularly the regional networks which are faced with decreased funding from NSF. As telecommunications networks search for ways to expand their user and financial bases, libraries quickly surface as a target audience. Unfortunately, network developers frequently fail to completely understand the library community's needs and/or potential contributions.

There are five major issues that are important to librarians if they are to consider seriously the use of State or regional telecommunications networks: increased functionality, performance reliability, consistent user assistance, access, and participation in governance (Molholt, 1987).

1. Increased Functionality

For the library community, functionality means two things: networks that run OSI, the basis for LSP, and networks that can access services such as database search services and public domain databases.

a. Adoption of OSI

NSF is attempting to facilitate the eventual migration from the TCP/IP protocol to OSI on its network by providing software that will allow applications developers to work in an OSI environment within the existing TCP/IP Internet, linking tens of thousands of host computers in the U.S. alone. An NBS group representing Federal agencies, established explicitly for the purpose, has developed the Government Open Systems Interconnect Profile (GOSIP). This profile was published in the Federal Register in October 1987 as a Federal standard. Comments resulting from the 90-day comment period, will be reviewed and changes will be made in mid-Spring 1988. After the standard goes into effect, it must be adopted by Federal agencies within 2 years. As with all such standards, if compliance is not possible, an agency must seek a waiver from the National Bureau of Standards. The Department of Defense is among the first to attempt implementation of OSI. Its success will have a major impact on contractors and universities who routinely do DOD research. With DOD's leadership, the acceptance of OSI should quickly filter outward to the State and regional networks. A similar effect has resulted in the information community with the adoption of OSI by LC.

b. Resources on the Network

The second aspect of functionality, making databases and other services available on the networks, is complicated by several factors. Issues of competition with the for-profit sector--copyright, payment, and access--all will have to be addressed. If all players in the network arena focus on the objective of facilitating the research and scholarship activities of the academic community, the path will be cleared to meeting the information needs of all citizenry. Participation in core decisions to meet this objective is vital to the credibility of the library profession. Educom, a national organization of academic institutions represented by computing professionals and university administrators is beginning to discuss, at least cursorily, most of these issues. A few librarians are already involved, if somewhat tangentially. Librarians must develop their own forum for these discussions as well as joining with Educom in seeking solutions. A potential forum exists in the Library of Congress Network Advisory Committee (NAC). This group has a broad membership representative of professional societies in the information handling field and of information distributors. Library Programs should strengthen its link to NAC and encourage the broadening of the group to include telecommunications specialists from NSF, representatives from State and regional telecommunications organizations, and Educom.

2. Performance Reliability

Performance reliability is a concern that touches all users. Librarians have experienced exceptional service from the bibliographic utilities and have come to expect that as the norm. As an example, OCLC's bank of computers for several years running has been down less than 1 percent of the time. Despite known patterns of peak load response degradation, the once-common cartoon of skeletons sitting at terminals waiting for a system response has disappeared from cataloging department bulletin boards. Contrary to their popular image, libraries are high-production facilities. The processes of selecting, ordering, receiving, paying for, cataloging, and circulating a single book require the orchestrated involvement of many people, together with equipment and systems.

If any of these fail, bottlenecks appear, backlogs occur and production stops. Librarians long ago left behind the option of reverting to manual operations. They have embraced technology as a means of survival amidst increased pressure for productivity in a period of steady or declining budgets. It is in this context that network performance is measured.

3. User Assistance

The third issue, user assistance, is a critical topic among telecommunications network administrators. They would do well to visit OCLC's User Desk operation to understand the standard by which librarians will measure this network service. In most telecommunications environments, users who have problems are shunted between those responsible for the various pieces of the system--hardware, phonelines, software--any of which may be viewed on a local, regional, or national level. The complexity of such networks is not necessarily greater than, for example, OCLC's, but the level of control over the constituent parts is totally different. State and regional network service centers offer more finger pointing than problem solving because the scope of their influence is limited to their piece of the network. Clearly what is needed is coordination among the pieces so that users can be treated as the valued customers they are. Librarians are accustomed to coordinated end-to-end problem solving. Organizations such as OCLC assume responsibility for all components of the system and work with vendors on a customer's behalf.

4. Access

In the past, NSF has focused its attention on the scientific community; the impetus for its development of networks was a need to facilitate the shared use of expensive and relatively unique computer resources, notably supercomputers. Today NSF is saying, at least unofficially, that whatever advances the work of the academic community is valid network activity. Some of the activities that may be carried on over NSFNET run headlong into competition with the commercial sector. Accessing database search services, such as Bibliographic Retrieval Services (BRS), and shared cataloging services, such as OCLC, via a government-supported network becomes a very delicate issue. Yet such activity is clearly furthering the work of the academic community. Eventually more precise guidelines for valid network activity will be developed by NSF and the academic community. In the interim there is a crack in the door for experimentation. The Network Resources Committee (NRC) of Educom's National Telecommunications Task Force (NTTF) is attempting to set up one or more projects toward this end. The use of HEA Title II-D and II-C monies could be expanded to include research and demonstration activities between libraries and networks.

On the State and regional level the access question differs slightly. How can one effectively overcome the economic and political barriers blocking or at least complicating resource/information sharing via networks among the varying levels of State and local governments, school districts, and the libraries that function at these same levels? This question, in particular, leads to the final overarching concern, participation in governance.

5. Governance

Libraries are unique players in the telecommunications game. They are both users and suppliers of information. One of the first ideas that comes into the minds of administrators trying to increase the use of their networks

is to put the library catalog on the network. Their approach to handling library information would be comical if it were not indicative of so large and unfortunate a gap in their understanding of the library as an information resource. The issues go well beyond making catalogs accessible on any particular network. How does one define service limits; what is the impact on remote borrowing, which currently exists only between libraries, not between individuals. Until these matters are worked out, access to catalog information does not mean availability except under the "old fashioned" rules and methods. Individuals may be able to access various library catalogs across the country, but they will still have to go to their local library to borrow an item. Work is underway within both RLG and OCLC to address these issues and to develop new service patterns, but the solution is not yet at hand.

Librarians are not alone in feeling they should be represented in the governance structures of telecommunications networks. The issue of governance, however, is a touchy one. If one likens telecommunications networks to a commercial telephone system from which service is purchased along with performance expectations (if not covered by actual standards) then one can dismiss the governance issue. However, telecommunications networks developed by and for the academic community are a different matter. They are akin to a not-for-profit organization with members or users as stakeholders. At a minimum, there should be a two-layer governance structure: a policy board and a technical board. In particular, the technical board must be representative of the user community, including librarians.

Although governance is a critical issue, the role of Library Programs in addressing it is limited. As an interested party, LP's most valuable contribution may be in educating State library agency personnel and academic librarians to the issues, the jargon, and the importance of assuming a proactive role for libraries in their States.

DEVELOPING OFFICE OF LIBRARY PROGRAMS' LEADERSHIP ROLE IN INTERLIBRARY COOPERATION

As already stated, Federal funding for library resources and activities has had a significant leveraging effect within States. It is important for Library Programs to consider a more focused point of application for its dollars. The area of maximum leverage is standards.

Increased standardization in the conduct of interactive library activities is really one more step along a well-established continuum. The 1979 study of LSCA Title III and HEA Title II-B done by Patrick, Casey, and Novales points out the impact Federal funding has had on inter- and intra-State cooperative programs for resource sharing.

> Federal emphasis on multitype library cooperation and networking has been of significant value in promoting cooperation and networking among librarians. Very few of the State Librarians and [LSCA] Project Directors believed library networking would have developed without LSCA III. Another dimension of LSCA III's impact upon the development and expansion of a multitype or intertype library cooperation, is the extent to which the States have incorporated the goal of LSCA III into their own LSCA III programs. If the States have uniformly adopted this goal and are striving to achieve it through library cooperation and networking projects, then at least the groundwork for cooperation and networking is set (Patrick, 1980).

Building on this groundwork is essential for the continued success of those programs fostered and developed through LSCA. It is by now well established that interlibrary sharing is integral to meeting the information needs of the library clientele. To ensure the capability for resource sharing, librarians must adhere to standards. Perhaps the most valuable role Federal funding can play in the next 5 years is to bridge the natural, economically driven gap between what librarians feel is right for their institution and what promotes the "greater good."

The purchase of catalog copy from the least expensive source (most often from vendors offering stand-alone CD-based systems) is a representative example. Librarians are finding it more costly to catalog using a shared catalog file such as RLIN or OCLC than to purchase records from vendors. The vendor has a single purpose--providing cataloging data. Vendors have no interest in creating a national database of cataloging records and item-location information. In such cases, records are purchased from a vendor and loaded into local, stand-alone systems. Nowhere is information recorded, even statewide, to indicate that Library X owns item A. Such isolationism, while marginally understandable from a national perspective, is totally untenable from a statewide view. Library X inadvertently, but nonetheless effectively, is limiting access to its resources to local use, and rendering such resources unavailable for sharing across the State and the nation. This backward step reminds us just how tenuous interlibrary sharing agreements are.

According to Markuson, "We need to make it known to Federal and State governments, and to the general public, that the extraordinary access to interlibrary information enjoyed in our country rests on local funding, local initiative, and professional cooperation on a virtually unique scale. Whether we can sustain continued national access to local collections without some Federal financial support is a critical issue for the next decade" (NAC, 1985). The issue is less one of overall funding than one of focused leverage with existing funding.

Networks enable librarians faced with information needs of clients beyond their local resources to identify and obtain materials and services for users. Network access is an enfranchising mechanism that can no longer be viewed as a luxury. However, without standards for record creation and maintenance, and the designation of State agencies as responsible for the collection and distribution of holdings information on a statewide basis, our ability to continue sharing resources is seriously jeopardized. It is possible to conceive of linking 50 State systems, but almost impossible to imagine linking thousands of independent, stand-alone systems. Unless State library agencies apply Federal and State funds to offset the cost differential between allowing isolated systems and requiring State-level aggregation of records, the goal of making library materials available as a national resource is doomed.

CONCLUSION AND RECOMMENDATIONS

Although the holdings of the LC are, without question, a national resource, in precise legal terms, there is no officially recognized or Federally supported "national database." De facto, and not without political problems, the combination of RLIN, OCLC, and LC forms such a database. The Federal government has invested heavily in the development and growth of this resource, not necessarily as a deliberate effort but through discretionary spending of LSCA monies on the part of State library agencies and HEA monies in the academic environment. The time has come to enforce standards directed at enabling and/or facilitating continued resource sharing.

Economic pressures are forcing librarians to make decisions which are rational for the institution in the short term, but simultaneously detract from the long-term goal of resource sharing. As Peter Drucker has said, "...long range planning does not deal with future decisions. It deals with the futurity of present decisions" (Drucker, 1973). The Federal government can play a significant role in creating a bridging mechanism between these short-term and long-term objectives. Federal library programs, such as LSCA and HEA, should be used to augment local support for the "greater good" of information sharing. Specifically, they should be used to ensure that books and other materials purchased with Federal funds are available for sharing on a nationwide basis. This will, in many cases, mean that Federal money will be used to pay the difference between creating a record locally and sharing it statewide, and eventually nationwide.

Networking, in both the technical and non-technical sense, is at a crossroads. Technology is most often used to do the traditional faster and better. To do different things requires behavioral change which is harder to achieve. Resource sharing is losing out to isolationism. Every time librarians choose to purchase cataloging data from vendors and load it into stand-alone systems, the Nation loses the ability to share the book represented by such records. One has to assume an increasing number of such "me first" decisions will be made. If skillfully applied, Federal funding can have significant impact on this problem.

The idea of Library Programs further increasing its influence in the expenditure of formula grant monies will be hotly debated and stridently contested by many. To help State library agencies in particular, a position/policy paper should be prepared which outlines the intentions of Library Programs, the rationale, and the benefits to the Nation. Library Programs should not wait for even consensus support, however. The view of State agencies on the matter of Federal oversight is well known.

State library agencies deserve, and must work to garner, increased influence in the information communities of their States. The respect and influence held by State library agencies vary greatly. In some States, they are minor players, competing with strong State university library systems. If Library Programs was afforded even modest discretionary funding, perhaps one-half of one percent of LSCA and HEA monies, they

could apply that funding to training and educating the library community toward more effective programming in the application of standards. The ultimate objective of all this, let us not forget, is to assist the public, not the library.

New administrative, fiscal, methodological, and long-term planning structures to advise Library Programs on both the process and the problems related to networking must be established. The library community still smarts from the words of a senator spoken during the 1979 White House Conference on Library and Information Services: "If you people don't know what you want, how do you expect us to help you." The issue, interestingly enough, was one closely related to networking--that of a National Periodicals Center. We still don't know what we want and we are suffering badly for that indecision.

There are no short-term solutions. Building up a program within the Federal bureaucracy is slow and difficult. I would estimate a time frame of 3 to 5 years for the successful implementation of the Leadership Program that I suggest below.

I propose the following actions for Library Programs:

1. Revise the regulations covering LSCA Title I, II, and III to require that LSCA funds used to support local or statewide library programs meet the following standards:

   a. quality cataloging as defined by minimal level cataloging acceptable to the Library of Congress, and coded using the MARC format,

   b. OSI compatibility of local systems as determined by tests conducted at the Library of Congress test facility, or its equivalent,

   c. preservation microfilming as defined by the Association of Research Libraries, and

In addition require:

   d. wide accessibility to local holdings information either by the creation of a State-wide database, or a State-wide network which links local systems in a uniformly accessible manner, and

   e. availability of all catalog records generated with Federal funds to the Library of Congress and bibliographic utilities.

If it is not possible for an agency to comply with these standards in the funding of projects it must seek an exemption, documenting its reasons. Library Programs must act on each case within a specified period of time following receipt of all relevant information. This recommendation is

not meant to take the decision on what to fund away from the States. It applies standards to that which the States choose to fund. Unjustified noncompliance will result in the withholding of funds.

2. Fund research and development leading to testing programs for measuring adherence to standards, and monitoring performance.

3. Participate in the development of standards in the areas of abstracting and indexing, full-text searching, and indepth subject access, all of which will contribute to the inter-operability of individualized systems. This means seeking participation directly, or by designating another agency to represent Library Program's interests, on the MARBI Committee of the American Library Association, the Z39 Committees of the National Information Standards Organization (NISO), and the LSP Applications Committee. Recognizing staff limitations, Library Programs should, at a minimum, request assistance from LC in keeping abreast of the work of these organizations. A number of Federal librarians are already involved and knowledgable about many of these issues. Their expertise could be tapped.

4. Work with the Library of Congress Network Advisory Committee and Educom to foster needed discussions on the topics of performance, functionality, user services, access, and governance. In addition, Library Programs should enter into dialogue with LC regarding expansion of the membership of the Network Advisory Committee to include representatives of State and regional telecommunications networks, Educom, and NSF.

5. Continue the dialogue begun with the National Science Foundation NSFNET Program in order to monitor progress on migration to the OSI standard. As an interim measure, the Library of Congress may serve as a resource for such information.

6. Establish as a funding priority within HEA Title II-B and II-C research efforts which explore library use of State and regional telecommunications networks. Also, fund experiments to mount public domain databases, structure information for casual outside access, and encourage discussions on the governance issues mentioned earlier in this paper.

7. Develop the technical expertise within LP to provide credibility and leadership capability for the networking effort. The stature and range of expertise of program officers in NEH and NEA serve as good models. This will mean seeking additional staff positions, and a reorganization of the current work force to better accommodate the increased need to reach out to the wider information community.

8. Seek discretionary funding to provide assistance to State library agencies to:

a. implement standards, and

b. educate staff on telecommunications issues and give them the knowledge and motivation to play a pro-active role within their States.

9. Prepare a position paper for distribution to State library agencies detailing the new policies, their intent, their methods of implementation, and the benefits to the States and the nation. The paper would also serve as a point of departure for discussions and further work with NSF, Educom, and others.

10. Develop a broadly based LP Networking Advisory Committee as a resource for new ideas, a sounding board for long-range plans, and a support mechanism within the profession. The information profession is a vast and complex one, encompassing increasing numbers of sub-fields and disciplines. An Advisory Committee would act as both a resource and a sounding board. It is also important to work closely with the Library of Congress' networking groups.

The Department of Education must recognize that the steps recommended in this report are going to be unpopular--particularly with the State library agencies that feel that LSCA money is an inalienable right. State agency directors will have to be convinced of the benefit to themselves, despite the fact that, initially, cooperation will be more costly to them. They have a critical role to play in assisting in the development of programs which preserve and ensure the long-term capability to share information resources.

This report argues for the development of an underlying information infrastructure parallel with the telecommunications infrastructure being created by NSF and other Federal agencies. These two structures together create a powerful resource for the nation to move forward in the information age. The role of Library Programs is as integral to the system as that of the National Science Foundation. Technology is an enabling force - at present allowing us to become highly individualized and highly decentralized. All this is for the good, if underpinned by common standards. This infrastructure can form the backbone of inter-operability that supports wide-ranging local and private initiatives. By promoting and coordinating diversity and individual initiative, the steps recommended here represent an appropriate level and direction for Federal involvement.

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